

## INTEGRATION OF AUTOMATED CRYOPUMP SAFETY PURGE

### ABSTRACT OF THE DISCLOSURE

An electronic controller is integral with a cryopump and provides an offline solution for purging a cryopump and an exhaust line during unsafe conditions. The electronic controller is responsible for controlling the opening and closing of purge, exhaust purge and gate valves coupled to the cryopump. The electronic controller can preempt any attempts from other systems to control these valves during unsafe conditions. An unsafe condition can be a power failure in the cryopump, a dangerous temperature in the cryopump or a temperature sensing diode that is not operating properly. When an unsafe condition is determined, the exhaust purge valve is opened and the gate valve closed, while the opening of a purge valve may be delayed for a safe period of time. If the unsafe condition still exists when the safe period of time elapses, the purge valve is allowed to open.

A fail-safe purge valve release and time delay mechanism can be used to ensure that the purge valve opens after the period of time elapses. Electrochemical capacitors store an amount of energy to hold a normally open purge valve closed for a safe period of time. When this energy is discharged and the unsafe condition still exists, the purge valve automatically opens.